

Attachment B

Regional Assessment of Public Health Benefits of Draft Scoping Plan: South Coast Air Basin

Overview

California has a long history of reducing the traditional “criteria” air pollutants that have direct health impacts, including ozone and airborne particulate matter (PM). Many of the sources addressed in the Draft Scoping Plan also emit pollutants that can lead to the formation of ozone or PM, making it likely that the Draft Scoping Plan will provide additional reductions of these precursor emissions and help California meet its health-based air quality goals.

This section addresses the potential reductions in precursor emissions, and the resulting air quality related health benefits, associated with select Draft Scoping Plan strategies. Air pollution levels are regional in nature, influenced by local emission sources, weather patterns, and topography. Similarly, health impacts estimates reflect local pollution and population patterns. As a result, it is appropriate to analyze the co-benefit on a regional basis. This analysis evaluates the co-benefits in the South Coast Air Basin (South Coast) as an example of potential benefits.

Emissions Benefits

California’s State Implementation Plan (SIP) identifies strategies designed to ensure that even the State’s smoggiest areas will meet air quality standards established by the U.S. Environmental Protection Agency (U.S. EPA). Numerous SIPs have been adopted and implemented for various standards, resulting in significantly cleaner air despite growth in the State’s population and economy. SIP revisions adopted in 2007-2008 (the 2007 SIP) identify the additional strategies needed to meet the national 8-hour ozone and fine particulate matter (PM_{2.5}) standards that were adopted in 1997 and 2002, respectively.

Table 1 presents the estimated Draft Scoping Plan co-benefits that will occur in the South Coast as well as the reductions projected from rules and regulations that are already in place, and the reductions that are projected to occur as a result of the recently adopted 2007 SIP. Additional ozone strategies will be developed to meet the 2023 emission target. The discussion that follows provides an explanation of each of the inventory scenarios, and the methodology used to estimate the Draft Scoping Plan co-benefits used in this analysis.

**Table 1: Decreasing Emissions in the South Coast Air Basin
(remaining emissions, tons per day)¹**

	NO_x	ROG	SO_x	PM_{2.5}
Current Emissions	1000	900	61	75
2020 Emissions Projection (existing programs)	530	540	52	71
2020 Emission Projection with new 2007 SIP Measures	380	470	26	61
2020 Emission Projection with Draft Scoping Plan Reductions (“co-benefits”)	370	460	26	59

¹ Table 1 does not include the criteria pollutant co-benefits of additional GHG reductions that would be achieved from the proposed cap-and-trade regulation because we cannot predict in which sectors they would be achieved. PM_{2.5} emission estimates include combustion sources and paved road dust.

Current Emissions: These emission estimates reflect the benefits of California's comprehensive state and local air pollution control programs. The benefits substantially increase each year as new, cleaner technologies are put in place. Included are mobile source controls such as emission standards for new cars and trucks, smog check, emission standards for new off-road engines, cleaner gasoline and diesel fuels, regulations to reduce evaporative emissions from consumer products, paints, and refueling, and regulatory programs that reduce emissions from stationary source emissions.

2020 Emissions Projection: The 2020 emissions projection reflects current air pollution control requirements along with projections of population and economic activity levels in 2020.

2007 State Implementation Plan: The South Coast is one of several areas in the State that do not meet the national 8-hour ozone standard, and one of only two California regions with PM2.5 levels above the national annual PM2.5 standard. In September 2007, ARB adopted the State Strategy for California's 2007 State Implementation Plan (2007 State Strategy). The control strategies identified in the 2007 State Strategy, together with emission reduction commitments in the locally adopted Air Quality Management Plan, are projected to result in attainment of the national PM2.5 standard by 2014 and significant progress towards ozone attainment. Additional strategies will be developed to bring the region fully into ozone attainment by 2023. Table 2 summarizes the projected 2020 NOx and PM2.5 emission benefits associated with control measures in the 2007 SIP for the South Coast Air Basin.

The 2007 State Strategy focuses on reducing emissions from the State's mobile sources such as trucks, construction equipment, and ocean-going ships. The diesel engines in many of these sources are designed to last for decades – as a result, there are opportunities to reduce emissions by upgrading or replacing older vehicles in these fleets. The 2007 SIP uses a combination of regulatory requirements and incentive programs to reduce emissions from business and commercial fleets. NOx emissions are precursors to both ozone and PM2.5. New State and local control strategies in the 2007 SIP for the South Coast Air Basin are projected to reduce NOx emissions by about 29 percent from 2020 projections. The 2007 SIP together with the Draft Scoping Plan co-benefits will reduce 2020 emissions by about 31 percent.

The 2007 SIP also includes local commitments for further development and exploration of 22 measures for which emission reductions cannot be quantified at this time.

Draft Scoping Plan Reductions: Table 1 also shows pollutant emission reductions anticipated to occur in the South Coast Air Basin as a result of the Draft Scoping Plan. The projected Draft Scoping Plan benefits are at least one order of magnitude smaller than the reductions attributed to the existing program and the 2007 SIP, in large part because of the effectiveness of the ozone and PM2.5 controls that will be in place by 2020. The methodology used to estimate the co-benefits focused on the most significant Draft Scoping Plan measures and is described below.

**Table 2: 2007 SIP New NOx and PM2.5 Measures
Estimated Emission Reductions in 2020, tons per day**

	NOx	PM_{2.5}
MOBILE SOURCES		
Passenger Vehicle Smog Check Improvements	8	0
Expanded Passenger Vehicle Retirement	1	0
Cleaner In-Use Heavy-Duty Trucks	27	2
AB923 Medium-Duty Vehicle High-Emitter Identification Program	1	0
Auxiliary Ship Engine Cold Ironing and Other Clean Technology	28	0
Cleaner Main Ship Engines and Fuel	32	3
Port Truck Modernization	8	0
Accelerated Introduction of Cleaner Line-Haul Locomotives	12	0
Clean Up Existing Harbor Craft	5	0
Cleaner In-Use Off-Road Equipment	19	2
AREAWIDE SOURCES		
Wood-Burning Fireplaces and Wood Stoves	0	1
Under-Fired Charbroilers	0	1
New and Redevelopment Projects	1	0
STATIONARY SOURCES		
NOx Reduction from Non-RECLAIM Ovens, Dryers and Furnaces	4	0
Further NOx Reductions from Space Heaters	2	0
Facility Modernization	2	1
REGIONAL TOTAL	150	10

Co-Benefits Estimation Methodology

Co-benefits were estimated for the four major sectors addressed in the Draft Scoping Plan, as discussed below. Draft Scoping Plan emission benefits for criteria pollutants were based on the ARB greenhouse gas inventory methodology. This inventory is comparable, but not identical to that used in the SIP.

Electricity Generation: The Draft Scoping Plan reflects the goals of increasing California's Renewable Portfolio Standard (RPS) for the mix of power generation to 33 percent by 2020, increasing the energy efficiency of new and existing buildings, and California's solar roof initiative. Statewide, these measures are designed to reduce fossil fuel generation by 88.1 terra watt-hours (TW-hrs) per year in 2020 – fossil fuel electrical generation is projected to account

for 369 TW-hrs per year without the Draft Scoping Plan strategies. The reduction in fossil fuel-based electrical generation – approximately 24 percent beyond today’s RPS level – was applied to forecasted electrical generation emissions in the South Coast Air Basin in 2020 to calculate the benefits of these measures in 2020.

Residential/Commercial Fuel Combustion: The Draft Scoping Plan considers energy efficiency improvements in the residential and commercial fuel combustion area that will reduce natural gas combustion rates by 826 million therms (MMtherms) in 2020. This value was divided by the statewide forecasted natural gas combustion rate in the residential and commercial sectors of 8,171 MMtherms to derive a reduction fraction of 10 percent. This reduction fraction was applied to the combined emissions of residential and commercial fuel combustion in the South Coast Air Basin to calculate the benefits of this measure in 2020.

Gasoline Measures – On-Road Motor Vehicles: The Draft Scoping Plan identifies greenhouse gas benefits from full implementation of AB1493 Pavley Phase I and Phase II for on-road passenger vehicles, from increased vehicle efficiency measures, such as tire pressure regulation, and from reduced growth in vehicle miles-traveled (VMT). These measures are estimated to provide additional reductions in gasoline combustion beyond what was accounted for in the SIP baseline emission inventory. The benefits for the South Coast Air Basin were based on statewide estimates to which the ratio of VMT estimated in SCAB to VMT estimated statewide in 2020 was applied.

Diesel Measures: The Draft Scoping Plan includes measures that will reduce vehicular diesel combustion emissions, including aerodynamic improvements, heavy-duty engine efficiency, and medium/heavy-duty hybridization; these measures are estimated to reduce fuel use by on-road heavy-duty trucks in the region by approximately five percent.

Industrial Measures: The Draft Scoping Plan also recommends an energy-efficiency audit for large industrial sources, an emissions cap for industrial sources, and indicates that additional measures for industrial sources are under evaluation. Emission reductions that may result from these industrial source approaches are speculative and cannot be quantified at this time.

Health Benefits Analysis

Ambient air quality standards are established to protect people from adverse health effects of associated with air pollution. The health impacts associated with ozone and PM_{2.5} range from respiratory effects to premature death. This section discusses the projected changes in health impacts that will occur as a result of the co-benefits of the Draft Scoping Plan in the South Coast Air Basin, California's most polluted region.

The methodology that ARB uses to quantify premature death and other health impacts from exposure to air pollutants is based on a peer-reviewed methodology developed by the U.S. Environmental Protection Agency (EPA). ARB augmented EPA's methodology by incorporating the results of new epidemiological studies relevant to California's population, including regionally specific studies, as they became available. The methodology was described in ARB's March 2006, *Emission Reduction Plan for Ports and Goods Movement (Goods Movement Plan)*. The specific application of ARB's methodology to this co-benefits analysis is discussed in Appendix D.

Table 3 shows relative benefits of the existing programs, 2007 SIP, and Draft Scoping Plan in the South Coast in 2020. There is uncertainty inherent in the values shown here represent the mean of a range of estimated impacts. These estimates do not provide an absolute number of health impacts avoided. Instead, they provide a way to compare the relative contribution of Draft Scoping Plan co-benefits to the improvements in public health expected from ARB's ongoing pollution control program. The health impacts are defined in Appendix D.

Table 3: Estimated Health Benefits of Existing Program, 2007 SIP, and Draft Scoping Plan In the South Coast Air Basin, 2020*

Health Impacts / Scenario	Benefits from Existing Program	Additional Benefits from 2007 SIP	Additional Co-Benefits from Draft Scoping Plan
Premature Deaths Avoided	1,600	920	160
Hospitalizations Avoided – Respiratory	330	200	33
Hospitalizations Avoided – Cardiovascular	610	360	62
Asthma & Lower Respiratory Symptoms Avoided	46,000	28,000	4,700
Acute Bronchitis Avoided	3,800	2,300	390
Work Loss Days Avoided	270,000	160,000	28,000
Minor Restricted Activity Days Avoided	1,600,000	940,000	160,000

*Uncertainty intervals for each estimated benefit range within 20-70 percent of the mean benefit (presented in this table). For example, the number of premature deaths avoided due to the Draft Scoping Plan could be between 43 to 270.